NORTH BRUNSWICK TOWNSHIP
PUBLIC SCHOOL DISTRICT

ARTHUR M. JUDD ELEMENTARY SCHOOL

1601 ROOSEVELT AVENUE
NORTH BRUNSWICK, NJ 08902

FACILITY ENERGY REPORT

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I. HISTORIC ENERGY CONSUMPTION/COST

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

Electric Utility Provider:	Public Service Electric & Gas
Electric Utility Rate Structure:	Large Power & Lighting Service (LPLS)
Third Party Supplier:	None

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	Large Volume Gas (LVG)
Third Party Supplier:	None

The electric usage profile represents the actual electrical usage for the facility. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile within each facility report shows the actual natural gas energy usage for the facility. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: LPLS
Meter No: 778012138
Account # E 42-126-500-02
Third Party Utility Provider: N/A
TPS Meter / Acct No: N/A

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Aug-11	50,845	297.0	$10,059
Sep-11	59,258	273.0	$8,500
Oct-11	52,986	210.0	$7,537
Nov-11	56,600	207.0	$7,979
Dec-11	53,022	183.0	$7,478
Jan-12	55,374	180.0	$7,930
Feb-12	55,970	207.0	$8,099
Mar-12	49,361	237.0	$7,380
Apr-12	55,029	234.0	$8,075
May-12	53,822	243.0	$11,925
Jun-12	38,228	255.0	$10,323
Jul-12	37,925	270.0	$10,513
Totals	**618,420**	**297.0 Max**	**$105,798**

AVERAGE DEMAND **233.0 KW average**
AVERAGE RATE **$0.171** **$/kWh**

Figure 1
Electricity Usage Profile

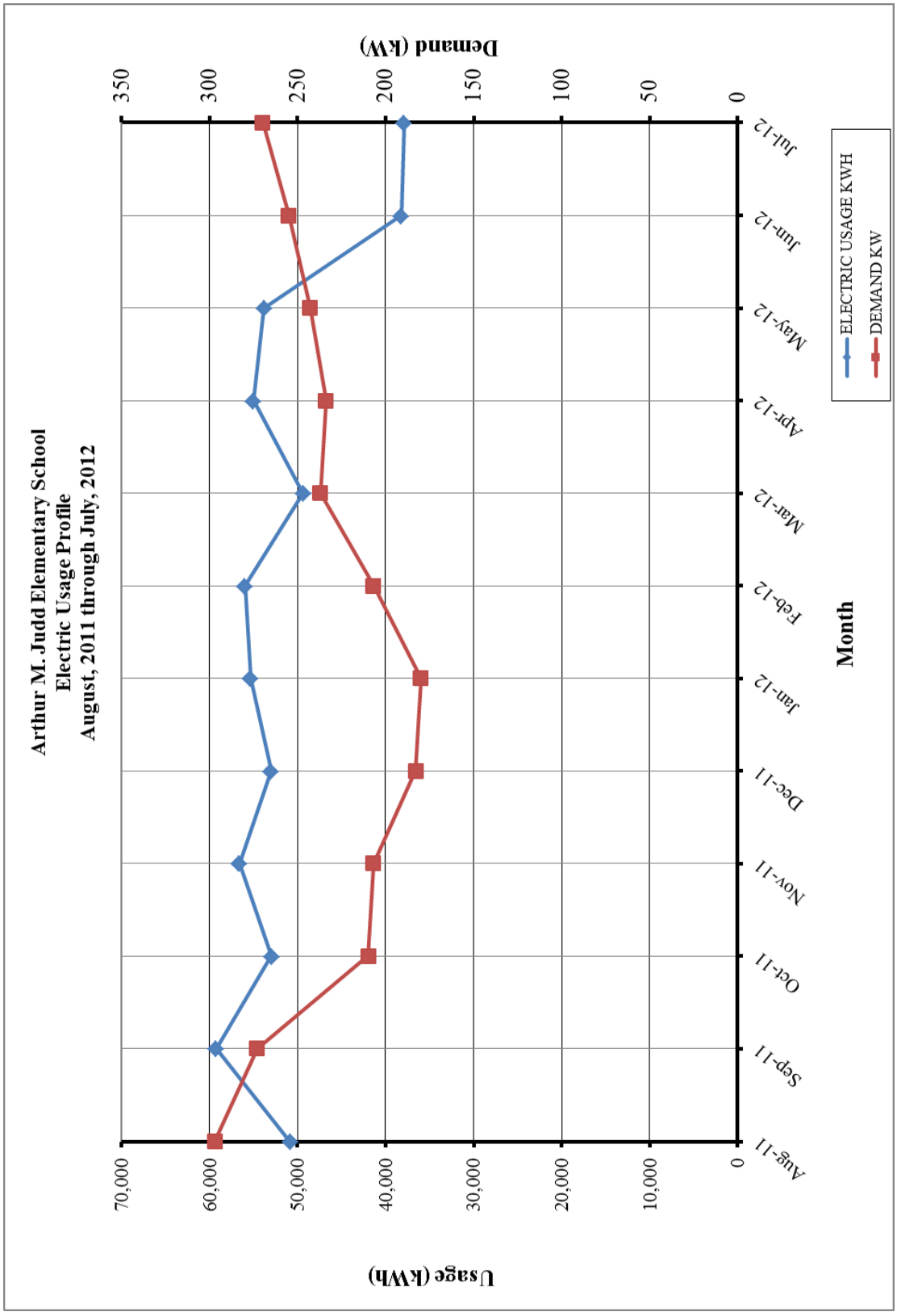
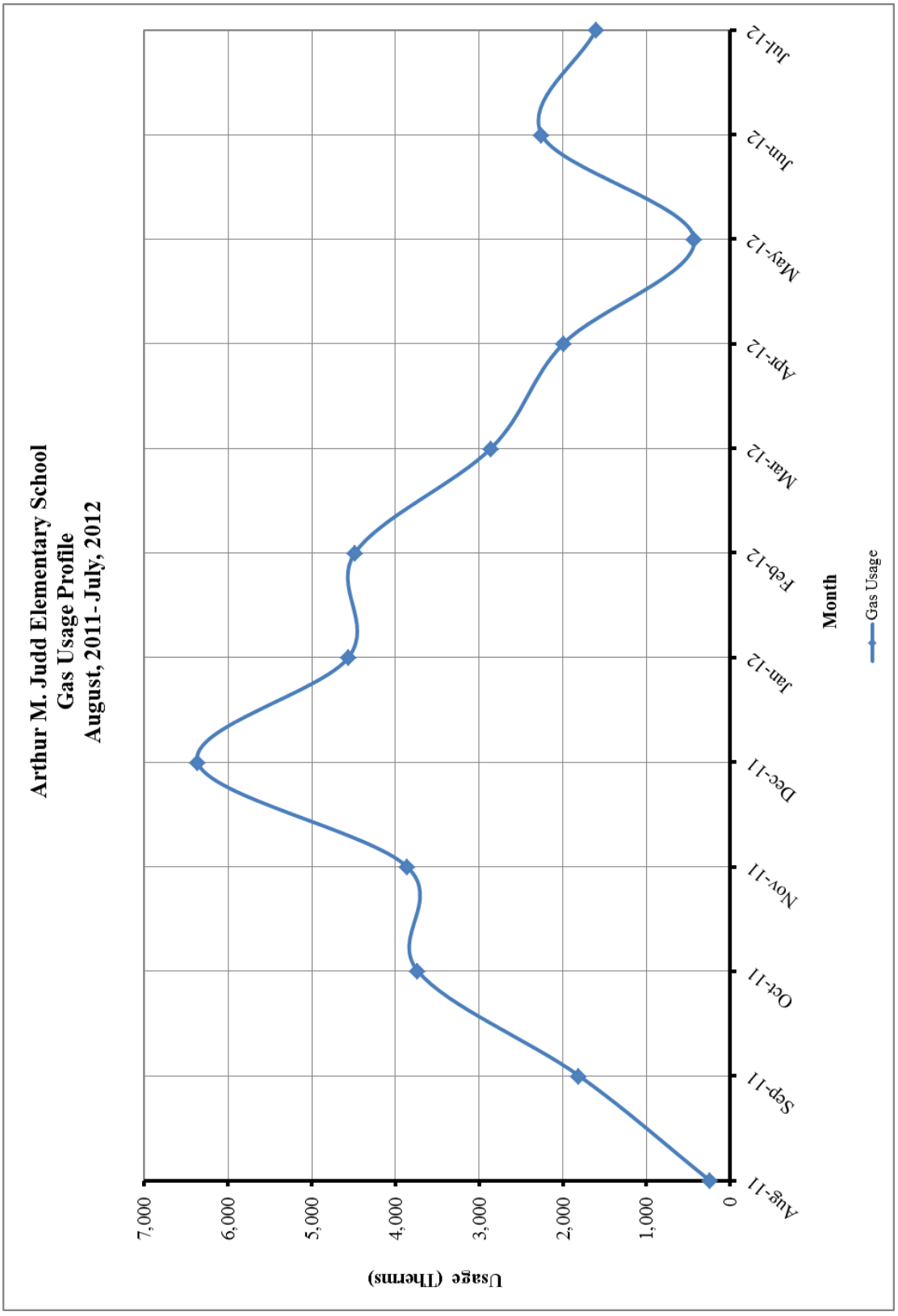


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G		
Rate: LVG		
Meter No: 3499592		
Point of Delivery ID: G 42-126-500-02		
Third Party Utility Provider: N/A		
TPS Meter No: N/A		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Aug-11	248.00	$297.01
Sep-11	1,808.00	$1,443.79
Oct-11	3,733.00	$3,552.59
Nov-11	3,864.00	$3,645.18
Dec-11	6,365.00	$5,559.67
Jan-12	4,562.00	$4,159.79
Feb-12	4,483.00	$3,905.08
Mar-12	2,857.00	$1,802.12
Apr-12	1,994.00	$1,258.12
May-12	431.00	$366.06
Jun-12	2,257.00	$1,535.19
Jul-12	1,601.00	$1,180.51
TOTALS	**34,203.00**	**$28,705.11**
AVERAGE RATE:	**$0.84**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The Arthur Judd Elementary School is located at 1601 Roosevelt Avenue in North Brunswick, New Jersey. The 88,595 SF Arthur Judd Elementary School was built in 1967 with the addition of the media center in 1988 and the additions for the 1st and 5th grade wings in 2008. The building is a single-story structure and consists of office space for administrative use, gymnasium, classrooms, kitchen, media center, cafeteria and mechanical rooms.

Occupancy Profile

The typical hours of operation for Arthur Judd Elementary School are Monday through Friday between 8:00 am and 4:30 pm, with custodial services running until 11:00 pm. The elementary school has a student population of 713 present for 10 months, and a year round occupancy of 68 administrative staff.

Building Envelope

Exterior walls for the Arthur Judd Elementary School are brick faced with a concrete block construction. The windows in the original wing are in below average condition with single pane windows and the remaining windows in the elementary school are in average condition. The roof is a flat, built up rubber roof with the original building containing stone ballasts that appears to be in good condition.

Heating Plant

Heating is provided to the facility from the Mechanical Room which houses two natural gas fired, cast iron sectional hot water boilers made by H.B. Smith. Both boilers have equivalent heating capacity characteristics having an input capacity of 3,270 MBH and output of 2,539 MBH for a combined output of 5,078 MBH. Both boilers appear to be maintained and in average condition. Combustion tests were not available for review but based on age the estimated fuel-to-thermal efficiency for the boilers is 65%, based on radiation losses and inefficiencies in operation inherent to the older technology. Both boilers are approximately 45 years old which exceed their typical ASHRAE service life of 35 years. At this time, the boilers are recommended for replacement. The heating hot water is circulated throughout the building via two constant speed end-suction pumps located in the Mechanical Room. The pumps are driven with standard efficiency motors that are recommended to be replaced with NEMA premium efficient motors. The hot water heating system provides heating hot water to the classroom units, hot water fin-tube radiators and heating and ventilation units throughout the facility. A single in-line pump is the most recent addition to the original boiler room which serves the AAON rooftop unit for supply of hot water to the 5th grade wing. This pump is combined with a Mitsubishi VFD for variable flow in the 5th grade wing.

Heating for the new Pre-K Wing is provided by two Aerco KC-1000 series boilers. The heating hot water is circulated through the new pre-k wing via two variable speed end-suction pumps located in the New Mechanical Room. The hot water from this boiler plant is also distributed to the Trane rooftop unit serving the Pre-K Wing.

HVAC Systems

The Library is conditioned via air handling units with split system condensing units located on the roof. These units are from the 1988 library addition and are recommended for replacement due to their old age and inefficiencies compared to newer units.

The new addition for the 5th grade wing is conditioned by a packaged rooftop unit manufactured by AAON. This unit is relatively new with R-410A refrigerant and hot water heat.

The All-Purpose Room is conditioned via an indoor air-handling unit that is of an older vintage but appears to be functioning. This unit is not recommended for replacement based on energy savings alone at this time.

The classrooms within the facility are conditioned via Venmar vertical unit ventilators with hot water and direct expansion coils. The accompanying condensing units on the roof are 3 ton Ducane condensing units. The units appear to have been replacement units and are not recommended for upgrades at this time.

The gymnasium and the cafeteria are conditioned via hot water air handling units which are served by the main hot water loop.

Exhaust System

Air is exhausted from the toilet rooms and other areas of the facility through the roof exhaust fans.

HVAC System Controls

The HVAC systems within the Arthur Judd Elementary School are controlled by various electronic controls systems. There are Tracer Summit Controls and Novar Controls. There is a modem installed in the control panel that provides supervisory control and monitoring to the Facilities Director. The Tracer Summit controls are only in place to operate the Trane rooftop unit which serves the Pre-k wing. The remaining sections of the building, including the 5th grade wing and library, are controlled by the Novar Controls.

Domestic Hot Water

The main source of domestic hot water for Arthur Judd Elementary School is an AO Smith 250 MBH gas fired water heater with an integrated storage capacity of 100 gallons. The Pre-k addition is served by a single A.O. Smith 150 MBH gas fired water heater with an integrated storage capacity of 60 gallons.

Lighting

Refer to the **Investment Grade Lighting Audit Appendix** for a detailed list of the lighting throughout the facility and estimated operating hours per space.

III. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

IV. ENERGY CONSERVATION MEASURES

Energy Conservation Measures are developed specifically for this facility. The energy savings and calculations are highly dependent on the information received from the site survey and interviews with operations personnel. The assumptions and calculations should be reviewed by the owner to ensure accurate representation of this facility. The following ECMs were analyzed:

Table 1
ECM Financial Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrade Gymnasium	$6,300	$520	12.1	23.8%
ECM #2	Lighting Controls Upgrade	$21,035	$4,051	5.2	188.9%
ECM #3	NEMA Premium Motor Replacements	$3,294	$118	27.9	-35.5%
ECM #4	AC Unit Upgrades	$69,359	$3,734	18.6	-19.2%
ECM #5	Boiler Upgrade	$189,579	$6,492	29.2	-14.4%
ECM #6	Computer Standby or Hibernate	$2,817	$4,461	0.6	2275.4%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	190.35 KW PV System	$1,226,479	$80,771	15.2	-1.2%

Notes: A. Cost takes into consideration applicable NJ Smart StartTM incentives.
B. Savings takes into consideration applicable maintenance savings.

Table 2
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrade Gymnasium	1.2	3,042	0
ECM #2	Lighting Controls Upgrade	0	23,690	0
ECM #3	NEMA Premium Motor Replacements	0.2	687	0
ECM #4	AC Unit Upgrades	10.9	21,837	0
ECM #5	Boiler Upgrade	0.0	0	7,728
ECM #6	Computer Standby or Hibernate	0.0	26,085	0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	190.35 KW PV System	190.4	223,072	0

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Upgrade Gymnasium	$520	$6,300	$0	$6,300	12.1
Lighting Controls Upgrade	$4,051	$22,650	$1,615	$21,035	5.2
~~NEMA Premium Motor Replacements~~	~~$118~~	~~$3,514~~	~~$220~~	~~$3,294~~	~~27.9~~
~~AC Unit Upgrades~~	~~$3,734~~	~~$71,429~~	~~$2,070~~	~~$69,359~~	~~18.6~~
Boiler Upgrade	$6,492	$195,579	$6,000	$189,579	29.2
Computer Standby or Hibernate	$4,461	$2,817	$0	$2,817	0.6
Design / Construction Extras (15%)	*$0*	*$34,102*	*$0*	*$34,102*	
Total Project	**$15,524**	**$261,448**	**$7,615**	**$253,833**	**16**

Note: ECM's with the strike-through font are not included in the ESIP.

Design / Construction Extras is shown as an additional cost for the facility project summary. This cost is included to estimate the costs associated with construction management fees for a larger combined project.

ECM #1: Lighting Upgrade – Gymnasium

Description:

The gymnasium at Arthur Judd Elementary School is currently lit via 250 watt Metal Halide HID fixtures. The space would be better served with a more efficient, fluorescent lighting system. Concord Engineering recommends upgrading the lighting to an energy-efficient T5 high output system that includes new four lamp, 54 watt high output fixtures.

This measure replaces all the HID, 250 watt HID MH fixtures with a well-designed T5 high output (HO) system. T5 High output fixtures with reflectors and wire guards will be required in order to meet the mandated 50 foot-candle average within the spaces.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix** that outlines the proposed retrofits, costs, savings, and payback periods.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$6,300
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$6,300
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$520
Total Yearly Savings ($/Yr):	$520
Estimated ECM Lifetime (Yr):	15
Simple Payback	12.1
Simple Lifetime ROI	23.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$7,800
Internal Rate of Return (IRR)	3%
Net Present Value (NPV)	($92.27)

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Arthur Judd Elementary School are left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are expected to be off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas.

The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the "Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways," document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the report:

- Occupancy Sensors for Lighting Control 20% - 28% energy savings.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 20% of the total light energy controlled by occupancy sensors (The majority of the savings is expected to be after school hours when rooms are left with lights on)

This ECM includes installation of ceiling or switch mount sensors for individual offices, classrooms, large bathrooms, and Media Centers. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent. The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

Energy Savings Calculations:

$$\text{Energy Savings} = (\%\ \text{Savings} \times \text{Controlled Light Energy}\ (\text{kWh/Yr}))$$

$$\text{Savings.} = \text{Energy Savings}\ (\text{kWh}) \times \text{Ave Elec Cost}\left(\frac{\$}{\text{kWh}}\right)$$

Rebates and Incentives:

From the **NJ Smart Start® Program Incentives Appendix**, the installation of a lighting control device warrants the following incentive:

Smart Start Incentive
= (# Wall mount sensors × $20 per sensor)
+ (# Ceiling mount sensors × $35 per sensor)

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$22,650
NJ Smart Start Equipment Incentive ($):	$1,615
Net Installation Cost ($):	$21,035
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$4,051
Total Yearly Savings ($/Yr):	$4,051
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.2
Simple Lifetime ROI	188.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$60,765
Internal Rate of Return (IRR)	18%
Net Present Value (NPV)	$27,325.78

ECM #3: Install NEMA Premium® Efficiency Motors

Description:

The improved efficiency of the NEMA Premium® efficient motors is primarily due to better designs with use of better materials to reduce losses. Surprisingly, the electricity used to power a motor represents 95 % of its total lifetime operating cost. Because many motors operate continuously 24 hours a day, even small increases in efficiency can yield substantial energy and dollar savings.

The electric motors driving the hot and cold water pumps are candidates for replacing with premium efficiency motors. These standard efficiency motors run considerable amount of time over a year.

This energy conservation measure replaces existing inefficient electric motors with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today.

IMPLEMENTATION SUMMARY					
EQMT ID	**FUNCTION**	**MOTOR HP**	**HOURS OF OPERATION**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**
P1A	Hot Water Pump	3	2,745	86.5%	89.5%
P1B	Hot Water Pump	3	2,745	86.5%	89.5%
HWC	Hot Water Circulator	1	2,745	82.5%	87.5%
HWC	Hot Water Circulator	1	2,745	82.5%	87.5%

Energy Savings Calculations:
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$$\text{Electric usage, kWh} = \frac{\text{HP} \times \text{LF} \times 0.746 \times \text{Hours of Operation}}{\text{Motor Efficiency}}$$

where, HP = Motor Nameplate Horsepower Rating

LF = Load Factor Motor Efficiency = Motor Nameplate Efficiency

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric cost savings} = \text{Electric Usage Savings} \times \text{Electric Rate} \left(\frac{\$}{\text{kWh}}\right)$$

The calculations were carried out and the results are tabulated in the table below:

PREMIUM EFFICIENCY MOTOR CALCULATIONS							
EQMT ID	MOTOR HP	LOAD FACTOR	EXISTING EFFICIENCY	NEMA PREMIUM EFFICIENCY	POWER SAVINGS kW	ENERGY SAVINGS kWH	COST SAVINGS
P1A	3	90%	86.5%	89.5%	0.08	215	$37
P1B	3	90%	86.5%	89.5%	0.08	215	$37
HWC	1	90%	82.5%	87.5%	0.05	128	$22
HWC	1	90%	82.5%	87.5%	0.05	128	$22
TOTAL					**0.2**	**687**	**$118**

Equipment Cost and Incentives

Below is a summary of SmartStart Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	NJ SMART START INCENTIVE
1	$50
1.5	$50
2	$60
3	$60
5	$60
7.5	$90
10	$100

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	MOTOR POWER HP	INSTALLED COST	SMART START INCENTIVE	NET COST	TOTAL SAVINGS	SIMPLE PAYBACK
P1A	3	$1,049	$60	$989	$37	26.9
P1B	3	$1,049	$60	$989	$37	26.9
HWC	1	$708	$50	$658	$22	30.0
HWC	1	$708	$50	$658	$22	30.0
TOTAL	**Totals:**	**$3,514**	**$220**	**$3,294**	**$118**	**28.0**

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$3,514
NJ Smart Start Equipment Incentive ($):	$220
Net Installation Cost ($):	$3,294
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$118
Total Yearly Savings ($/Yr):	$118
Estimated ECM Lifetime (Yr):	18
Simple Payback	27.9
Simple Lifetime ROI	-35.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$2,124
Internal Rate of Return (IRR)	-4%
Net Present Value (NPV)	($1,671.09)

ECM #4: Replace AC Units with High Efficiency Units

Description:

The Arthur Judd Elementary School utilizes split system cooling only units as well as a packaged rooftop unit with hot water and gas heat to condition several spaces within the school. The units suggested to be replaced have capacities ranging from 2 tons 5 tons. Please refer to the **Major Equipment List Appendix** for further information about these units.

These units are in average condition though the current units in operation are not high efficiency units. These units are approximately nineteen years old and have surpassed their ASHRAE service life of fifteen years.

These units can be replaced with new higher efficiency units. New split system and packaged units provide higher full load and part load efficiencies due to advances in inverter motor technologies, heat exchangers and higher efficiency refrigerants such as R410A which would be used in place of R22 that is currently used in the units.

This ECM includes one-for-one replacement of the older packaged and split system units with new higher efficiency systems which include new evaporator coils and refrigerant lines as well as indoor units. It is recommended to fully evaluate the capacity needed for all new systems prior to moving forward with this ECM. A summary of the unit replacements for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
SS	Library	1	18,000	1.5	Carrier 24ACB
SS	Mechanical Office	1	18,000	1.5	Carrier 24ACB
SS	Boys Locker Room	1	24,000	2.0	Carrier 24ACB
SS	Comp Lab/Library	5	30,000	2.5	Carrier 24ACB
RTU	Nurse	1	60,000	5.0	Carrier 48XL-A
Total		**9**	**150,000**	**22.5**	

The manufacturers used as the basis for the calculation is Carrier. The unit pricing and install cost were estimated based on current rates quotes and labor rates. The payback may change based on actual unit pricing and install costs if the ECM is implemented.

Energy Savings Calculations:

Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity,} \frac{\text{BTU}}{\text{Hr}} \times \left(\frac{1}{\text{SEER}_{\text{Old}}} - \frac{1}{\text{SEER}_{\text{New}}} \right) \times \frac{\text{Operation Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

$$\text{Cooling Cost Savings} = \text{Energy Savings, kWh} \times \text{Cost of Electricity} \left(\frac{\$}{\text{kWh}} \right)$$

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**EXISTING UNITS SEER**	**SPLIT UNITS SEER**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
SS	18,000	2,000	9 SEER	15.5 SEER	1	1,677	0.8
SS	18,000	2,001	13 SEER	15.5 SEER	1	447	0.2
SS	24,000	2,002	10 SEER	15.5 SEER	1	1,705	0.9
SS	30,000	2,003	9 SEER	15.5 SEER	5	13,999	7.0
RTU	60,000	2,004	10 SEER	15 SEER	1	4,008	2.0
Total					9	21,837	10.9

Project Cost, Incentives and Maintenance Savings

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	**INSTALLED COST**	**# OF UNITS**	**TOTAL COST**	**REBATES**	**NET COST**	**ENERGY SAVING**	**PAY BACK YEARS**
SS	$4,377	1	$4,377	$138	$4,239	$287	14.8
SS	$4,377	1	$4,377	$138	$4,239	$76	55.5
SS	$6,525	1	$6,525	$184	$6,341	$292	21.7
SS	$41,750	5	$41,750	$1,150	$40,600	$2,394	17.0
RTU	$14,400	1	$14,400	$460	$13,940	$685	20.3
Total	$71,429	9	$71,429	$2,070	$69,359	$3,734	18.6

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$71,429
NJ Smart Start Equipment Incentive ($):	$2,070
Net Installation Cost ($):	$69,359
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,734
Total Yearly Savings ($/Yr):	$3,734
Estimated ECM Lifetime (Yr):	15
Simple Payback	18.6
Simple Lifetime ROI	-19.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$56,010
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($24,782.92)

ECM #5: Condensing Boiler Installation

Description:

There are two existing H.B. Smith 450 Mills boilers which are used as the primary source of heat for Arthur Judd Elementary School. These boilers serve the hot water loop throughout the original building. The H.B. Smith boilers are approximately 45 years old and have surpassed their life expectancy of a typical cast iron boiler and should be considered for replacement. With the increased efficiency of the condensing boilers, the savings can be substantial.

New condensing boilers could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature. Due to the operating conditions of the building, the annual average operating efficiency of the proposed condensing boiler is expected to be 92%. The existing boiler's efficiency is approximately 65%, which makes the condensing boilers an 27% increase in efficiency. This ECM is based on variable supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of two condensing gas fired boilers to replace the existing H.B. Smith cast iron boilers. The basis for this ECM is Aerco condensing boiler; model number BMK – 3.0. The boiler installation is based on a one for one replacement based on capacity of the existing boiler.

Energy Savings Calculations:

Total Gas Therms Used:	34,203 Therms
Baseline Hot Water Gas Use:	4,849 Therms
New Boiler Section:	3,021 Therms
For Old Boiler Section:	34,203 Therms – 4,849 Domestic HW – 3,021 New Section = 26,333 Therms

*Existing Therm usage for Old boiler section and new boiler section determined by a preliminary load calculation through Trace 700 program.

$$Bldg\ Heat\ \mathrm{Re}quired = Existing\ Nat\ Gas\ (Therms) \times Heating\ Eff.(\%) \times Fuel\ HeatValue\left(\frac{BTU}{Therm}\right)$$

$$\mathrm{Pr}oposed\ Heating\ Gas\ Usage = \frac{Bldg\ Heat\ \mathrm{Re}quired\ (BTU)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

$$Energy\ Cost = Heating\ Gas\ Usage(Therms) \times Ave\ Fuel\ Cost\left(\frac{\$}{Therm}\right)$$

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Cast Iron Boilers	New Condensing Boilers	
Existing Nat Gas (Therms)	26,333	0	
Boiler Efficiency (%)	65%	92%	27%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	1,712	1,712	
Gas Cost ($/Therm)	0.84	0.84	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	26,333	18,605	7,728
Energy Cost ($)	$22,120	$15,628	$6,492
COMMENTS:			

Note: Concord Engineering is utilizing a seasonal average efficiency of 92% to account for efficiencies based on an outside air reset schedule.

From the **NJ Smart Start Appendix**, the installation of new condensing boilers warrants the following incentive: $1.00 per MBH.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$195,579
NJ Smart Start Equipment Incentive ($):	$6,000
Net Installation Cost ($):	$189,579
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$6,492
Total Yearly Savings ($/Yr):	$6,492
Estimated ECM Lifetime (Yr):	25
Simple Payback	29.2
Simple Lifetime ROI	-14.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$162,300
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($76,533.07)

ECM #6: Set Computers to Automatic Stand-by or Hibernate Modes

Description:

During the survey, it was noticed that the majority of the computers were left at ON position with the monitors at Screen Saver or OFF positions.

Many personal computers (PC) came equipped with automatic Sleep Mode or Hibernate (power down) mode features. Normally computers boot up from Sleep Mode or Hibernate mode much faster than powering up from Shut Down position.

Based on an independent study by the U.S. Department of Energy, Energy star® rated computers use approximately 70% less power during Sleep Mode. It is recommended to set up the PCs at this facility to switch into Sleep Mode after a short period of inactivity and Hibernate mode after a long period of inactivity.

This ECM includes configuring the computers in the classrooms and the offices such that they automatically switch into:

- Sleep Mode after 15 minutes of inactivity
- Hibernate after 60 minutes of inactivity

The inactivity times above can be adjusted based on experience or preference. Even though this ECM can be implemented easily in house, the calculations assume an independent computer technician performing the task at a typical market rate.

Energy Savings Calculations:

No. of Computers:	169
Operating Weeks per Yr:	42
Estimated percentage of computers left ON overnight:	75%

$$\text{Electric Usage} = \frac{\#\text{of Computers} \times \text{Computer Power (W)} \times \text{Operation (Hrs)}}{1000\left(\frac{\text{W}}{\text{KW}}\right)}$$

$$\text{Energy Cost} = \text{Electric Usage(kWh)} \times \text{Ave Elec Cost}\left(\frac{\$}{\text{kWh}}\right)$$

The cost of configuring the computers to automatically sleep or hibernate is based on 10 minutes per computer per technician at an hourly rate indicated below.

Implementation Costs: = # Computers X Configuration Time X Cost per Hour
= 169 Computers X 10 Minutes/Computer X $100 per Hour

= $2,817

AUTOMATIC SLEEP OR HIBERNATE MODES FOR COMPUTERS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Manual Operation	Auto Power Save	-
# of Computers	169	169	-
% Computers left ON	75%	75%	-
Power when left ON (Watt)	50	50	-
Power at Stand-by (Watt)	5	5	-
Power at Hibernate (Watt)	4	4	-
Power when OFF (Watt)	0	0	-
Operating Weeks per Yr	42	42	-
Operating Hours per Week	168	168	-
Hours/Wk Computers ON	120	20	-
Hours/Wk at Sleep Mode	0	20	-
Hours/Wk at Hibernate Mode	0	80	-
Hours/Wk at Power Down	48	48	-
Elec Cost ($/kWh)	0.171	0.171	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	31,941	5,856	26,085
Energy Cost ($)	$5,462	$1,001	$4,461
COMMENTS:	Calculation assumes computers currently run throughout work week and get shut down over the weekend.		

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$2,817
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$2,817
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$4,461
Total Yearly Savings ($/Yr):	$4,461
Estimated ECM Lifetime (Yr):	15
Simple Payback	0.6
Simple Lifetime ROI	2275.4%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$66,915
Internal Rate of Return (IRR)	158%
Net Present Value (NPV)	$50,438.13

REM #1: 190.35 kW Solar System

Description:

The Arthur Judd Elementary School has available roof and parking lot space that could accommodate a significant amount of solar generation. Based on the available areas a 190.35 kilowatt solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 223,072 kilowatt-hours annually that will reduce the overall electric usage of the facility by 36.07%.

Energy Savings Calculations:

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas. Financial results in table below are based on 100% financing of the system over a fifteen year period.

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
System Size (KW_{DC}):	190.35
Electric Generation (KWH/Yr):	223,072
Installation Cost ($):	$1,226,479
SREC Revenue ($/Yr):	$42,626
Energy Savings ($/Yr):	$38,145
Total Yearly Savings ($/Yr):	$80,771
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	15.2
Analysis Period Electric Savings ($):	$709,461
Analysis Period SREC Revenue ($):	$617,483
Net Present Value (NPV)	($411,120.45)

V. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

E. Turn off computers when not in use. Ensure computers are not running in screen saver mode which saves the monitor screen not energy.

F. Ensure outside air dampers are functioning properly and only open during occupied mode.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

North Brunswick Twp. Public Schools - Arthur Judd Elementary School

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY														
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade Gymnasium	$3,600	$2,700	$0	$6,300	$520	$0	$520	15	$7,800	$0	23.8%	12.1	2.80%	($92.27)
ECM #2	Lighting Controls Upgrade	$19,200	$3,450	$1,615	$21,035	$4,051	$0	$4,051	15	$60,765	$0	188.9%	5.2	17.56%	$27,325.78
ECM #3	NEMA Premium Motor Replacements	$2,602	$912	$220	$3,294	$118	$0	$118	18	$2,124	$0	-35.5%	27.9	-4.26%	($1,671.09)
ECM #4	AC Unit Upgrades	$32,617	$38,813	$2,070	$69,359	$3,734	$0	$3,734	15	$56,010	$0	-19.2%	18.6	-2.56%	($24,782.92)
ECM #5	Boiler Upgrade	$112,010	$83,569	$6,000	$189,579	$6,492	$0	$6,492	25	$162,300	$0	-14.4%	29.2	-1.16%	($76,533.07)
ECM #6	Computer Standby or Hibernate	$0	$2,817	$0	$2,817	$4,461	$0	$4,461	15	$66,915	$0	2275.4%	0.6	158.36%	$50,438.13
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	190.35 KW PV System	$1,226,479	$0	$0	$1,226,479	$38,145	$42,626	$80,771	15	$1,211,564	$639,384	-1.2%	15.2	-0.15%	($262,240.73)

Notes:

1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
2) The variable DR in the NPV equation stands for Discount Rate
3) For NPV and IRR calculations: From n=0 to N periods where N is the *lifetime of ECM* and Cn is the *cash flow during each period* .

APPENDIX B

Concord Engineering Group, Inc.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February 15, 2011:

Electric Chillers

Water-Cooled Chillers	$12 - $170 per ton
Air-Cooled Chillers	$8 - $52 per ton

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $92 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit, AFUE ≥ 92%

Ground Source Heat Pumps

Closed Loop	\$450 per ton, EER ≥ 16 \$600 per ton, EER ≥ 18 \$750 per ton, EER ≥ 20

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

Variable Air Volume	\$65 - \$155 per hp
Chilled-Water Pumps	\$60 per VFD rated hp
Compressors	\$5,250 to \$12,500 per drive
Cooling Towers ≥ 10 hp	\$60 per VFD rated hp

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons, 0.67 energy factor or better	\$50 per unit
Gas-Fired Water Heaters > 50 gallons	\$1.00 - \$2.00 per MBH
Gas-Fired Booster Water Heaters	\$17 - \$35 per MBH
Gas Fired Tankless Water Heaters	\$300 per unit

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$25 per fixture (1-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	\$7 per bulb
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	\$10 per fixture
Hard-Wired Compact Fluorescent	\$25 - \$30 per fixture
Metal Halide w/Pulse Start Including Parking Lot	\$25 per fixture
T-5 and T-8 High Bay Fixtures	\$16 - \$200 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	\$70 per fixture

Prescriptive Lighting - LED

LED New Exit Sign Fixture Existing Facility < 75 kw Existing Facility > 75 kw	 $20 per fixture $10 per fixture
LED Display Case Lighting	$30 per display case
LED Shelf-Mtd. Display & Task Lights	$15 per linear foot
LED Portable Desk Lamp	$20 per fixture
LED Wall-wash Lights	$30 per fixture
LED Recessed Down Lights	$35 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	$175 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	$175 per fixture
LED Outdoor Wall-Mounted Area Luminaries	$100 per fixture
LED Parking Garage Luminaries	$100 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	$50 per fixture
LED High-Bay and Low-Bay Fixtures for Commercial & Industrial Bldgs.	$150 per fixture
LED High-Bay-Aisle Lighting	$150 per fixture
LED Bollard Fixtures	$50 per fixture
LED Linear Panels (2x2 Troffers only)	$100 per fixture
LED Fuel Pump Canopy	$100 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	$42 per 5 foot $65 per 6 foot

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled
Daylight Dimming - office	$50 per fixture controlled

Premium Motors

Three-Phase Motors	$45 - $700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	$40 per electronic communicated motor

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2007 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	$0.16 KWh and $1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

APPENDIX C

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
North Brunswick BOE - Arthur Judd Elementary School

Building ID: 3315747
For 12-month Period Ending: July 31, 2012[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: November 07, 2012

Facility
North Brunswick BOE - Arthur Judd Elementary School
1601 Roosevelt Avenue
North Brunswick, NJ 08902

Facility Owner
North Brunswick Township Board of Education
300 Old Georges Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Susan Irons
300 Old Georges Road
North Brunswick, NJ 08902

Year Built: 1967
Gross Floor Area (ft²): 88,595

Energy Performance Rating[2] (1-100) 67

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,122,502
Natural Gas (kBtu)[4]	3,476,165
Total Energy (kBtu)	5,598,667

Energy Intensity[4]

Site (kBtu/ft²/yr)	63
Source (kBtu/ft²/yr)	121

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	485

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	75
National Median Source EUI	143
% Difference from National Median Source EUI	-15%
Building Type	K-12 School

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Meets Industry Standards[5] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Certifying Professional
Michael Fischette
520 South Burnt Mill Road
Voorhees, NJ 08043

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) or a Registered Architect (RA) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE or RA in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	North Brunswick BOE - Arthur Judd Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	1601 Roosevelt Avenue, North Brunswick, NJ 08902	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Arthur Judd Elementary School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	88,595 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	169	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Public Service Electric & Gas Co

Fuel Type: Electricity

Meter: Electric (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
06/16/2012	07/15/2012	38,100.00
05/16/2012	06/15/2012	53,700.00
04/16/2012	05/15/2012	54,900.00
03/16/2012	04/15/2012	49,200.00
02/16/2012	03/15/2012	55,800.00
01/16/2012	02/15/2012	55,200.00
12/16/2011	01/15/2012	52,800.00
11/16/2011	12/15/2011	56,400.00
10/16/2011	11/15/2011	52,800.00
09/16/2011	10/15/2011	59,100.00
08/16/2011	09/15/2011	50,700.00
Electric Consumption (kWh (thousand Watt-hours))		**578,700.00**
Electric Consumption (kBtu (thousand Btu))		**1,974,524.40**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,974,524.40**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: Gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
06/16/2012	07/15/2012	2,257.00
05/16/2012	06/15/2012	431.00
04/16/2012	05/15/2012	1,994.00
03/16/2012	04/15/2012	2,857.00
02/16/2012	03/15/2012	4,483.00
01/16/2012	02/15/2012	4,562.00
12/16/2011	01/15/2012	6,365.00
11/16/2011	12/15/2011	3,864.00
10/16/2011	11/15/2011	3,733.00
09/16/2011	10/15/2011	1,808.00
08/16/2011	09/15/2011	248.00

Gas Consumption (therms)	**32,602.00**
Gas Consumption (kBtu (thousand Btu))	**3,260,200.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**3,260,200.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	☐

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
North Brunswick BOE - Arthur Judd Elementary School
1601 Roosevelt Avenue
North Brunswick, NJ 08902

Facility Owner
North Brunswick Township Board of Education
300 Old Georges Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Susan Irons
300 Old Georges Road
North Brunswick, NJ 08902

General Information

North Brunswick BOE - Arthur Judd Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	88,595
Year Built	1967
For 12-month Evaluation Period Ending Date:	July 31, 2012

Facility Space Use Summary

Arthur Judd Elementary School	
Space Type	K-12 School
Gross Floor Area (ft^2)	88,595
Open Weekends?	No
Number of PCs	169
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	100
Percent Heated	100
Months °	10
High School?	No
School District °	north brunswick twp

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 07/31/2012)	**Baseline** (Ending Date 07/31/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	67	67	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	63	63	58	N/A	75
Source ($kBtu/ft^2$)	121	121	112	N/A	143
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	485	485	448	N/A	573
$kgCO_2e/ft^2$/year	5	5	5	N/A	6

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Median column presents energy performance data your building would have if your building had a median rating of 50.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.

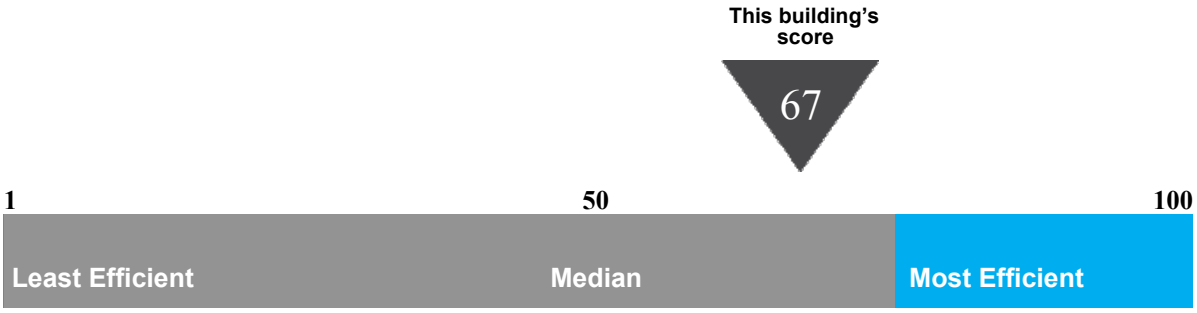
Statement of Energy Performance

2012

North Brunswick BOE - Arthur Judd Elementary School
1601 Roosevelt Avenue
North Brunswick, NJ 08902

Portfolio Manager Building ID: 3315747

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.



This building uses 121 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending July 2012

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 11/07/2012

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Arthur Judd Elementary School

AC Units

Tag		RTU-3	
Unit Type	Split System Condensing Unit	Packaged Rooftop Unit	Split System Condensing Unit
Qty	32	1	1
Location	Roof	Roof	Roof
Area Served	Classroom Unit Ventilators	Pre-K New Wing	Girls Locker Office
Manufacturer	Ducane	Trane	EMI
Model #	2AC13B36P-1A	SLHFF75E4B66	S1CA9000D00
Serial #	4606055725	C08C02543	1-07-G-7201-1G
Cooling Type	DX, R-22	DX, R-22	DX, R-22
Cooling Capacity (Tons)	3 Tons	75 Tons	9000 BTU/Hr
Cooling Efficiency (SEER/EER)	13 SEER	-	13 SEER / 11.7 EER
Heating Type	N/A	Hot Water Heat	N/A
Heating Input (MBH)	N/A	-	N/A
Efficiency	N/A	-	N/A
Fuel	N/A	-	N/A
Approx Age	8	4	5
ASHRAE Service Life	15	15	15
Remaining Life	7	11	10
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

AC Units

Tag			
Unit Type	Split System Condensing Unit	Split System Condensing Unit	Split System Condensing Unit
Qty	1	2	3
Location	Roof	Roof	Roof
Area Served	Boys Locker Office	Comp Lab	Library
Manufacturer	International Comfort Products	Trane	Trane
Model #	AG024GB3	TTD730B100A0	TTA030A300A0
Serial #	L982623140	49238068	D22229015
Cooling Type	DX, R-22	DX, R-22	DX, R-22
Cooling Capacity (Tons)	2 Tons	2.5 Tons	2.5 Tons
Cooling Efficiency (SEER/EER)	10 SEER	9 SEER	9 SEER
Heating Type	N/A	N/A	N/A
Heating Input (MBH)	N/A	N/A	N/A
Efficiency	N/A	N/A	N/A
Fuel	N/A	N/A	N/A
Approx Age	14	24	23
ASHRAE Service Life	15	15	15
Remaining Life	1	(9)	(8)
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

AC Units

Tag			RTU-1
Unit Type	Split System Condensing Unit	Split System Condensing Unit	Packaged Rooftop Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Library	Mechanical Office	New 5th Grade Wing
Manufacturer	Dynazone	Sea Breeze	Aaon
Model #	S181FS/C181C	18A23ZOGX	RM-030-8-0-BB02-EJN
Serial #	DC 106530	-	200801-AMWT02855
Cooling Type	DX, R-22	DX, R-22	DX, R410A
Cooling Capacity (Tons)	1.5 Tons	1.5 Tons	30 Tons
Cooling Efficiency (SEER/EER)	9 SEER	13 SEER	9.5 EER
Heating Type	N/A	N/A	Hot Water Heat
Heating Input (MBH)	N/A	N/A	-
Efficiency	N/A	N/A	-
Fuel	N/A	N/A	-
Approx Age	15	15	4
ASHRAE Service Life	15	15	15
Remaining Life	0	0	11
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

AC Units

Tag			
Unit Type	Packaged Rooftop Unit	Split System Condensing Unit	
Qty	1	1	
Location	Roof	Roof	
Area Served	Nurse	Offices	
Manufacturer	Trane	Goodman	
Model #	YCD060A3H0AB	CKL60-3L	
Serial #	F35142497D	0506038673	
Cooling Type	DX, R-22	DX, R-22	
Cooling Capacity (Tons)	5 Tons	5 Tons	
Cooling Efficiency (SEER/EER)	9 EER	10 SEER	
Heating Type	Natural Gas	N/A	
Heating Input (MBH)	135 MBH	N/A	
Efficiency	80%	N/A	
Fuel	Natural Gas	N/A	
Approx Age	21	7	
ASHRAE Service Life	15	15	
Remaining Life	(6)	8	
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Arthur Judd Elementary School

Boilers

Tag		B-1,2	
Unit Type	Cast Iron Sectional Boilers	Gas Fired Hot Water Boiler	
Qty	2	2	
Location	Boiler Room	New Mechanical Room	
Area Served	Hot Water Loop	New Pre-k Wing Hot Water Loop	
Manufacturer	HB Smith	Aerco	
Model #	450 Mills - 16 Sections	KC Series	
Serial #	NJ4591-1-H	G-07-1704	
Input Capacity (Btu/Hr)	3,270	1,000 MBH	
Rated Output Capacity (Btu/Hr)	2,539	860-930 MBH	
Approx. Efficiency %	65.0%	86-93%	
Fuel	Natural Gas	Natural Gas	
Approx Age	45	5	
ASHRAE Service Life	35	24	
Remaining Life	(10)	19	
Comments	Industrial Combustion Burner M/N:FPG-42		

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Arthur Judd Elementary School

Domestic Water Heaters

Tag			
Unit Type	Domestic Hot Water Heater	Domestic Hot Water Heater	
Qty	1	1	
Location	Boiler Room	New Wing Mech Room	
Area Served	Domestic Hot Water Loop	New Wing Domestic Loop	
Manufacturer	A.O. Smith	A.O. Smith	
Model #	BTH 250A 100	BTH 120 100	
Serial #	0817M000741	L07M004239	
Size (Gallons)	100 Gallons	60 Gallons	
Input Capacity (MBH/KW)	250 MBH	120 MBH	
Recovery (Gal/Hr)	287.87 GPH	136.72 GPH	
Efficiency %	95%	95%	
Fuel	Natural Gas	Natural Gas	
Approx Age	4	5	
ASHRAE Service Life	12	12	12
Remaining Life	8	7	12
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Arthur Judd Elementary School

Pumps

Tag	P1A,P1B	P2A,P2B	P5
Unit Type	Base Mounted End Suction	In-Line	In-Line
Qty	2	2	1
Location	Boiler Room	Boiler Room	Boiler Room
Area Served	Main Hot Water Loop	Zone Pump	5th Grade Wing
Manufacturer	-	Armstrong Pumps	Bell & Gossett
Model #	-	-	-
Serial #	-	-	-
Horse Power	3 HP	1 HP	2 HP
Flow		-	-
Motor Info	Marathon Electric	Marathon Electronic	Bell & Gossett
Electrical Power	208-220/440/3/60	208-230/460/3/60	208-230/460/3/60
RPM	1740 RPM	1725 RPM	1725 RPM
Motor Efficiency %	86.5%	82.5%	84.0%
Approx Age	20	20	5
ASHRAE Service Life	18	18	18
Remaining Life	(2)	(2)	13
Comments		P2A is currently not installed.	Mitsubishi VFD on Pump

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

Pumps

Tag	P-1,2		
Unit Type	Base Mounted End Suction		
Qty	2		
Location	New Mechanical Room		
Area Served	New Wing Hot Water		
Manufacturer	Bell & Gossett		
Model #	1510 Series		
Serial #	C049535-01 J70		
Horse Power	7.5 HP		
Flow	180 GPM @ 90 FTHD		
Motor Info	Emerson		
Electrical Power	200/3/60		
RPM	1760 RPM		
Motor Efficiency %	91.7%		
Approx Age	4		
ASHRAE Service Life	18		
Remaining Life	14		
Comments	Mitsubishi VFD on Pumps		

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

APPENDIX E

CEG Project #: 9C12053
Facility Name: Arthur Judd Elementary School
Address: 1601 Roosevelt Avenue
City, State, Zip North Brunswick, NJ 08902

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
231.33	CST 212	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	8	0.69	1,789	Existing to Remain	0	3	86	0	0.69	1,789	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	358	$61
231.33	Classroom 211	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$92
227.21	Classroom 211	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	338	Existing to Remain	0	2	65	0	0.13	338	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Observation 210	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	1	0.09	224	Existing to Remain	0	3	86	0	0.09	224	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Observation 208	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 207	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$92
227.21	Classroom 207	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	338	Existing to Remain	0	2	65	0	0.13	338	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Restroom 211 + 208	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	298	Existing to Remain	0	2	62	0	0.25	298	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Restroom 211 + 208	1200	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	156	Existing to Remain	0	2	65	0	0.13	156	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Storage 206	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	0	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.31	Electrical Room	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	5	0.31	806	Existing to Remain	0	2	62	0	0.31	806	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 204	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	16	0.99	2,579	Existing to Remain	0	2	62	0	0.99	2,579	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	516	$88
227.23	Classroom 204	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	0	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 204 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	3	0.19	223	Existing to Remain	0	2	62	0	0.19	223	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 203	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	16	0.99	2,579	Existing to Remain	0	2	62	0	0.99	2,579	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	516	$88
227.23	Classroom 203	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	0	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 203 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	3	0.19	223	Existing to Remain	0	2	62	0	0.19	223	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 202	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	16	0.99	2,579	Existing to Remain	0	2	62	0	0.99	2,579	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	516	$88
227.23	Classroom 202	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	0	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 202 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	3	0.19	223	Existing to Remain	0	2	62	0	0.19	223	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 201	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	16	0.99	2,579	Existing to Remain	0	2	62	0	0.99	2,579	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	516	$88
227.23	Classroom 201	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	676	Existing to Remain	0	2	65	0	0.26	676	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.29	Classroom 201 Restroom	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Wallwasher	2	62	3	0.19	223	Existing to Remain	0	2	62	0	0.19	223	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.31	Classroom 103	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	23	0.76	1,973	Existing to Remain	0	1	33	0	0.76	1,973	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	395	$67
211.31	Classroom 103 Restroom	1200	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	1	0.03	40	Existing to Remain	0	1	33	0	0.03	40	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
211.31	Classroom 102	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	21	0.69	1,802	Existing to Remain	0	1	33	0	0.69	1,802	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	360	$62
211.31	Classroom 101	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	21	0.69	1,802	Existing to Remain	0	1	33	0	0.69	1,802	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	360	$62
211.31	Classroom 106	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	21	0.69	1,802	Existing to Remain	0	1	33	0	0.69	1,802	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	360	$62
211.31	Classroom 105	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	21	0.69	1,802	Existing to Remain	0	1	33	0	0.69	1,802	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	360	$62
211.31	101-102 Restroom	1200	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	2	0.07	79	Existing to Remain	0	1	33	0	0.07	79	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.31	105-106 Restroom	1200	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	2	0.07	79	Existing to Remain	0	1	33	0	0.07	79	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.31	Classroom 104	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	21	0.69	1,802	Existing to Remain	0	1	33	0	0.69	1,802	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	360	$62
231.33	Classroom 219	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$92
227.21	Classroom 219	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	338	Existing to Remain	0	2	65	0	0.13	338	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 215	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$92
227.21	Classroom 215	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	338	Existing to Remain	0	2	65	0	0.13	338	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Observation 218	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	1	0.09	224	Existing to Remain	0	3	86	0	0.09	224	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Observation 216	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	1	0.09	224	Existing to Remain	0	3	86	0	0.09	224	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Storage 217	1200	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	1	0.09	103	Existing to Remain	0	3	86	0	0.09	103	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Classroom 214	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	6	0.37	967	Existing to Remain	0	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	193	$33
221.33	Classroom 213	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	6	0.37	967	Existing to Remain	0	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	193	$33
232.22	Classroom 108	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	268	$46
232.22	Conference Room 109	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$31
211.11	Classroom 110	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 112	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 113	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 115	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	110-112 Prep	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	4	0.13	343	Existing to Remain	0	1	33	0	0.13	343	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	69	$12
211.11	113-115 Prep	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	4	0.13	343	Existing to Remain	0	1	33	0	0.13	343	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	69	$12
211.11	Classroom 116	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 118	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44

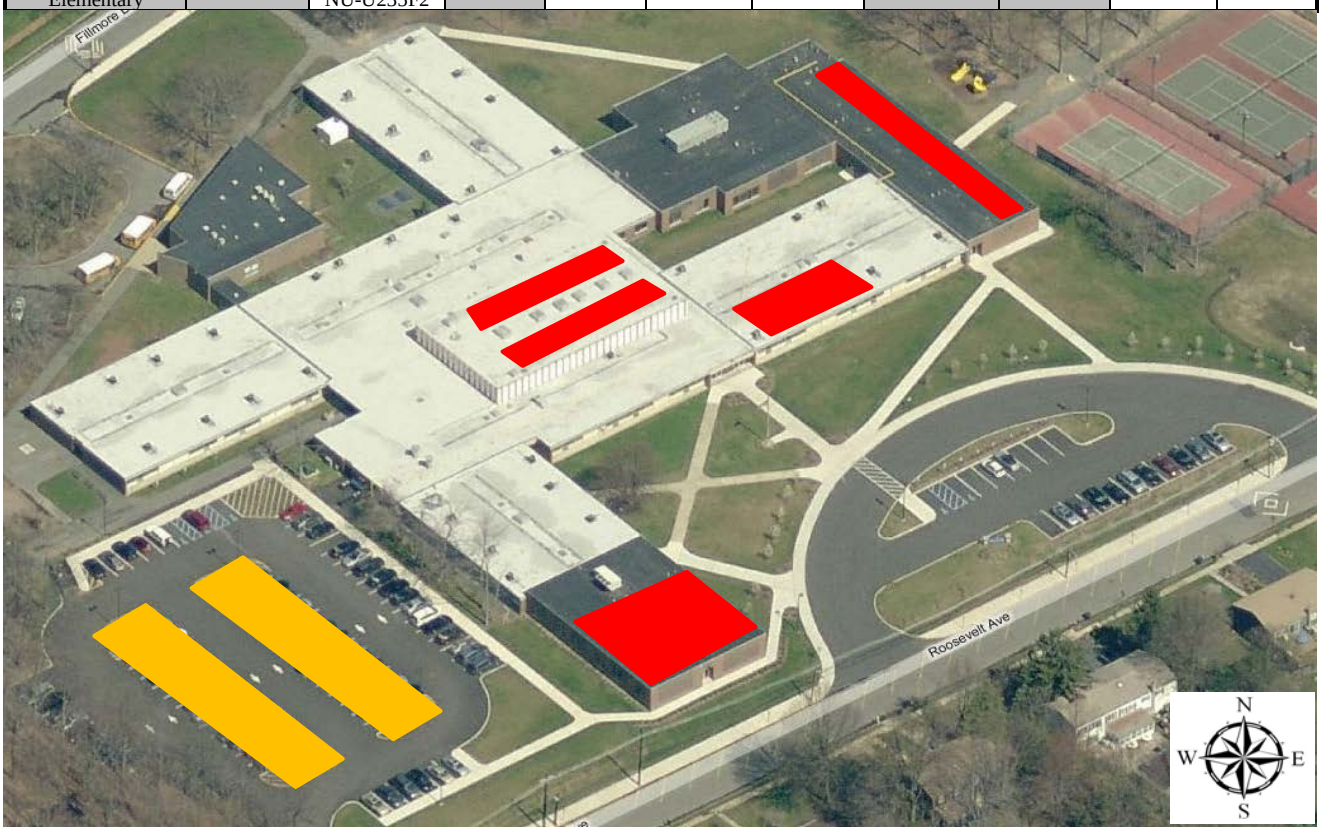
			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
211.11	Classroom 119	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 121	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	116-118 Prep	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	4	0.13	343	Existing to Remain	0	1	33	0	0.13	343	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	69	$12
211.11	119-121 Prep	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	4	0.13	343	Existing to Remain	0	1	33	0	0.13	343	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	69	$12
227.21	Girl's Restroom	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	338	Existing to Remain	0	2	65	0	0.13	338	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Boy's Restroom	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	3	0.20	507	Existing to Remain	0	2	65	0	0.20	507	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.14	Custodial Closet	2000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	2	62	1	0.06	124	Existing to Remain	0	2	62	0	0.06	124	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
247.21	Faculty Lounge	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	1	0.09	224	Existing to Remain	0	3	86	0	0.09	224	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	Faculty Lounge	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	9	0.30	772	Existing to Remain	0	1	33	0	0.30	772	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	154	$26
221.41	Faculty Restroom	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	0	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.11	Classroom 129	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	9	0.77	2,012	Existing to Remain	0	3	86	0	0.77	2,012	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	402	$69
242.11	Classroom 129	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.11	Classroom 129 Storage	1200	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	2	0.17	206	Existing to Remain	0	3	86	0	0.17	206	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.11	Classroom 129A	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	9	0.77	2,012	Existing to Remain	0	3	86	0	0.77	2,012	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	402	$69
242.11	Classroom 131	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	9	0.77	2,012	Existing to Remain	0	3	86	0	0.77	2,012	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	402	$69
242.21	Girl's Restroom	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Boy's Restroom	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	Media Center	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	40	3.44	8,944	Existing to Remain	0	3	86	0	3.44	8,944	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	2	20.0%	1,789	$306
602	Media Center	2600	(2) 7w CFL Exit Sign	2	16	1	0.02	42	Remove and Return	LED Exit Sign	1	2	1	0.00	5	0.01	36	$6	$25.00	$100.00	$125.00	$0.00	20.08	0	No New Controls	0	0.0%	0	$0
242.21	Media Center Office	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	8	0.69	1,789	Existing to Remain	0	3	86	0	0.69	1,789	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	358	$61
242.22	Media Center Classroom	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	16	1.38	3,578	Existing to Remain	0	3	86	0	1.38	3,578	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	716	$122
211.11	Classroom 135	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 136	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	4	0.13	343	Existing to Remain	0	1	33	0	0.13	343	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	69	$12
211.11	Classroom 137	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 138	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 139	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
211.11	Prep 138-139	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	4	0.13	343	Existing to Remain	0	1	33	0	0.13	343	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	69	$12
211.11	Classroom 138	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 142	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	2	0.07	172	Existing to Remain	0	1	33	0	0.07	172	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	Classroom 143	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 144	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
211.11	Classroom 145	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	2	0.07	172	Existing to Remain	0	1	33	0	0.07	172	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	Classroom 146	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, surface Mnt., Prismatic Lens	1	33	15	0.50	1,287	Existing to Remain	0	1	33	0	0.50	1,287	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	257	$44
221.11	Cafeteria	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	46	1.52	3,947	Existing to Remain	0	1	33	0	1.52	3,947	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	4	20.0%	789	$135
222.21	Kitchen	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	9	0.56	1,451	Existing to Remain	0	2	62	0	0.56	1,451	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	290	$50
221.11	Kitchen	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	6	0.20	515	Existing to Remain	0	1	33	0	0.20	515	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.11	Therapy Room	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	1	33	3	0.10	257	Existing to Remain	0	1	33	0	0.10	257	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	51	$9
227.21	Therapy Room	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	338	Existing to Remain	0	2	65	0	0.13	338	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.14	Copy/Storage	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	2	62	8	0.50	1,290	Existing to Remain	0	2	62	0	0.50	1,290	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	258	$44
231.33	Classroom	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$92
222.21	Lobby	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	8	0.50	1,488	Existing to Remain	0	2	62	0	0.50	1,488	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Main Office	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	0	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.11	Main Office	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	10	0.86	2,236	Existing to Remain	0	3	86	0	0.86	2,236	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	447	$76
247.21	Hall	3000	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	4	0.34	1,032	Existing to Remain	0	3	86	0	0.34	1,032	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.11	Principal's Office	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$31
221.14	Files	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	2	62	1	0.06	161	Existing to Remain	0	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.11	Directors Office	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$31
232.21	Nurse	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	10	0.86	2,236	Existing to Remain	0	3	86	0	0.86	2,236	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	447	$76
221.41	Main Office Restroom	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	0	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
745	Gym	2600	250w MH, Prismatic Lens	1	295	18	5.31	13,806	Remove and Return	1x4, 4 Lamp, 54w T5HO, Elect. Ballast, Lo Bay	6	230	18	4.14	10,764	1.17	3,042	$520	$3,600.00	$2,700.00	$6,300.00	$0.00	12.11	4	Dual Technology Occupancy Sensor - Remote Mnt.	3	20.0%	2,153	$368
221.14	Stage	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	2	62	6	0.37	967	Existing to Remain	0	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.21	Room 159	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
232.21	Copy/Storage	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Girl's Restroom	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	3	0.20	507	Existing to Remain	0	2	65	0	0.20	507	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Boy's Restroom	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	3	0.20	507	Existing to Remain	0	2	65	0	0.20	507	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
247.21	Custodial Closet	2000	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	1	0.09	172	Existing to Remain	0	3	86	0	0.09	172	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Classroom 153	2001	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	248	Existing to Remain	0	2	62	0	0.12	248	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Classroom 152	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	0	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$99
222.21	Classroom 151	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	0	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$99
222.21	Classroom 150	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	0	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$99
222.21	Classroom 149	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	0	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$99
222.21	Classroom 148	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	0	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$99
231.33	Classroom 178	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 176	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	9	0.77	2,012	Existing to Remain	0	3	86	0	0.77	2,012	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 175	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 174	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 173	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 172	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 171	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
231.33	Classroom 170	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Electrical/Custodial Room	2000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	5	0.31	620	Existing to Remain	0	2	62	0	0.31	620	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Boiler Room	4000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	9	0.56	2,232	Existing to Remain	0	2	62	0	0.56	2,232	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Corridors	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	127	7.87	23,622	Existing to Remain	0	2	62	0	7.87	23,622	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
601	Corridors	8760	(2) 7w CFL Exit Sign	2	16	1	0.02	140	Remove and Return	LED Exit Sign	1	2	1	0.00	18	0.01	123	$21	$25.00	$100.00	$125.00	$0.00	5.96	0	No New Controls	0	0.0%	0	$0
	TOTAL					**1,042**	**71**	**181,722**					**20**	**69.97**	**178,521**	**1.20**	**3,201**	**$547**	**$3,650.00**	**$2,900.00**	**$6,550.00**	**$0.00**				**69**		**23,690**	**$4,051**

APPENDIX F

Location Description	Area (Sq FT)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Total KW_{AC}	Panel Weight (41.9 lbs)	W/SQFT
Arthur Judd Elementary	16000	SHARP NU-U235F2	810	17.5	14,208	190.35	223,072	154.2	33,939	13.40



.= Proposed PV Layout = Proposed Parking PV Layout

Notes:

1. Estimated kWH based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.

Project Name: **LGEA Solar PV Project - Arthur Judd Elementary**
Location: **North Brunswick, NJ**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$1,226,479
Annual kWh Production	223,072
Annual Energy Cost Reduction	$38,145
Average Annual SREC Revenue	$42,626

Simple Payback: **15.18** Years

Life Cycle Cost Analysis

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.171**
Financing Rate: 6.00%
Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/kWh) $0.191

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$0	0	0	0	$0	0	0	0	0
1	$0	223,072	$38,145	$0	$55,768	$72,174	$52,023	($30,283)	($30,283)
2	$0	221,957	$39,290	$0	$55,489	$68,965	$55,232	($29,418)	($59,701)
3	$0	220,847	$40,468	$0	$55,212	$65,558	$58,638	($28,517)	($88,218)
4	$0	219,743	$41,682	$0	$54,936	$61,942	$62,255	($27,579)	($115,797)
5	$0	218,644	$42,933	$2,252	$54,661	$58,102	$66,095	($28,855)	($144,651)
6	$0	217,551	$44,221	$2,241	$43,510	$54,025	$70,171	($38,706)	($183,358)
7	$0	216,463	$45,547	$2,230	$43,293	$49,697	$74,499	($37,586)	($220,944)
8	$0	215,381	$46,914	$2,218	$43,076	$45,102	$79,094	($36,425)	($257,369)
9	$0	214,304	$48,321	$2,207	$42,861	$40,224	$83,973	($35,222)	($292,591)
10	$0	213,232	$49,771	$2,196	$31,985	$35,045	$89,152	($44,637)	($337,228)
11	$0	212,166	$51,264	$2,185	$31,825	$29,546	$94,651	($43,293)	($380,521)
12	$0	211,105	$52,802	$2,174	$31,666	$23,708	$100,489	($41,903)	($422,425)
13	$0	210,050	$54,386	$2,164	$31,507	$17,510	$106,687	($40,467)	($462,891)
14	$0	208,999	$56,018	$2,153	$20,900	$10,930	$113,267	($49,432)	($512,323)
15	$0	207,954	$57,698	$2,142	$20,795	$3,944	$120,253	($47,845)	($560,168)
	Totals:	3,231,467	$709,461	$24,162	$617,483	$636,472	$1,226,479	($560,168)	($4,068,469)

Net Present Value (NPV) **($411,120)**